

ANNOTATIONES ZOOLOGICAE JAPONENSES

Volume 54, No. 1—March 1981

Published by the Zoological Society of Japan

The First Flightless Trechodine (Coleoptera, Trechinae)
from the Nepal Himalaya¹⁾

With 3 Text-figures

Shun-Ichi UÉNO

*Department of Zoology, National Science Museum (Nat. Hist.),
Shinjuku, Tokyo 160, Japan*

ABSTRACT A new apterous species of trechodine trechid is described for the first time from the Asian Continent. It closely resembles *Pachytrechodes* from East Africa, but is regarded as constituting a new genus in view of the fact that it is doubtless descended from a *Trechodes*-like ancestor independent of the East African trechodines. The new species, named *Himalotrechodes insignis*, is mesophilous, inhabiting dense oak forests at the high altitude of the eastern Himalayas.

Early in the summer of 1972, Mr. Hiroshi MAKIHARA, who participated in the Kyushu University Scientific Expedition to the Nepal Himalaya 1972, obtained a specimen of a very strange trechid beetle in East Nepal. He later submitted the insect to me for taxonomic study, together with a small lot of other Trechinae. A careful examination revealed that the insect in question was most probably a relative of *Trechodes* theretofore unknown from the Himalayas, though it was doubtless different generically from *Trechodes* itself. I was, however, unable to go further to introducing it into science, as the single known specimen was not only a female less important taxonomically but was rather in a poor condition of preservation. It was therefore one of the main purposes of my joining the National Science Museum Expedition 1979 to East Nepal to obtain some more specimens, especially males, of this interesting species and to clarify its systematic status.

During the expedition, I made every possible effort to obtain as many specimens of Trechinae as possible, but the trechodine was not easily met with. It was near the end of our trip that Mr. NISHIKAWA finally succeeded in finding out a male specimen of the trechodine in a dense oak forest at the easternmost part of the Nepal Himalaya. Another specimen, a female, was also caught on the same day by means of a sifting method. These newly obtained specimens, both fully mature and in a perfect condition, amply proved that the

1) This study is supported by the Grants-in-aid for Scientific Research Nos. 404101 and 504301 from the Ministry of Education, Japan.

insect belonged to a new genus similar, at least superficially, to *Pachytrechodes* of East Africa, hence included in the subtribe Trechodina of the tribe Trechodini.

The confirmation that the species in question belongs to Trechodina beyond all reasonable doubt is very important not only for trechine taxonomy but for the zoogeographic study of this group of small beetles. The subtribe is pronouncedly southern in the present distribution, mainly occurring in New Caledonia (1 endemic genus), Australia and Tasmania (3 endemic genera and 1 widespread genus), Madagascar (1 widespread genus) and Africa (1 endemic and 1 widespread genera). Apart from these, only two alate species belonging to *Trechodes* are known, one from southern Luzon in the Philippines (*T. bakeri* JEANNEL, 1926, pp. 488, 491, fig. 266) and the other from northern Burma (*T. cauliops* (H. W. BATES, 1892), p. 298; JEANNEL, 1923, p. 415, fig. 10, 1926, pp. 488, 490, figs. 262–263, 271). No trechodines have hitherto been found in the large part of the Indian Subcontinent, including the Himalayas. JEANNEL (1942, p. 270) pointed out this supposed blank in trechodine distribution as follows: "Il faut remarquer tout d'abord qu'aucun *Trechodes* n'est connu de l'Inde. Les Carabiques ripicoles de la région orientale ont été suffisamment bien étudiés pour qu'on puisse en déduire que le genre *Trechodes* ne doit y être représenté que par le seul *T. cauliops*, des montagnes de la Birmanie, d'ailleurs l'espèce la plus caractérisée de tout le genre."

So far as concerned with alate forms, nothing has been added to our knowledge about the trechodine fauna of Asia since JEANNEL's time,²⁾ in spite of repeated entomological investigations made by various parties in the Himalayas. I myself, who have a fairly good field experience of trechodines in the Philippines, Australia and Tasmania, made special searches for them in the Nepal Himalaya, but without success. The majority of these beetles usually live at the edges of running waters; brachypterous individuals of *Cyphotrechodes gibbipennis* (BLACKBURN) and *Trechobembix baldensis* (BLACKBURN), both Australo-Tasmanian, frequently occur in wet soil beside standing waters or in wet mosses near narrow streams, but even these seldom leave the waterside. Only the exceptions hitherto known are the new Himalayan species and *Pachytrechodes* of Mt. Uluguru in Tanzania.

At any rate, the discovery of the new apterous species in the Himalayas proves that certain ancestral forms of *Trechodes* with fully developed hind wings must have existed in that area, or possibly occur there even now. JEANNEL's comment cited above has lost its ground, and the origin of the tribe Trechodini can be sought in

2) JEANNEL (1954, p. 10) described *Eocnides* from Assam and placed it at the side of *Cnides* MOTSCHULSKY (1862, p. 38) from Central and South Americas, that is, in the subtribe Cnidina of the tribe Trechodini (JEANNEL, 1958, pp. 732–733). I have seen a male specimen of an *Eocnides* from Sichuan (=Szechwan) in China, and compared it with JEANNEL's type (female) of *E. assamensis* at the Muséum National d'Histoire Naturelle, Paris. The Chinese specimen seemed somewhat different from the Assamese, though I was unable to draw a final conclusion as regards its systematic status. What is more important is that *Eocnides* has nothing in common with *Cnides* in the structure of male genitalia and actually belongs to the tribe Trechini, *not* to the tribe Trechodini. It may have some relationship to *Trechiotes* JEANNEL (1954, pp. 13–14) from Northern Viet-Nam.

the Asian Continent, not in Gondwana. Further proofs are, of course, needed to develop this line of argument; what can be said at present is that the mountainous areas in South Asia becomes more and more important for the study of Trechinae.

In the following lines, the new Himalayan species will be described under the name of *Himalotrechodes insignis*. The abbreviations to be employed are the same as those explained in previous papers of mine.

Genus *Himalotrechodes* S. UÉNO, nov.

Type-species: *Himalotrechodes insignis* S. UÉNO, sp. nov.

Related to *Trechodes* BLACKBURN (1901, p. 119; JEANNEL, 1926, pp. 479, 484), but distinguished at first sight from the widespread genus by the short broad body with short oval elytra which are strongly convex on the disc, the absence of inner wings, relatively small head with reduced eyes, tumid genae and deep non-canaliculate frontal furrows, the fused labium with a deep concavity at the middle, the disposition of elytral stria 1, which is subparallel to suture before the level of posterior dorsal pore and does not join scutellar striole, the position of preapical pore which is very close to elytral apex, and the short flat aedeagus with simple apical lobe. Very similar to *Pachytrechodes* JEANNEL (1960, p. 42) in many key characters, including the structure of buccal organ, the apterism, the disposition of the sutural stria on elytra, and the conformation of male genitalia, but the present genus can be separated from the East African one by the following points: anterior supraorbital pore very large, forming a remarkable fovea; mentum tooth either rounded or subtruncated at the tip, not cleft at the tip as in *Pachytrechodes*; prothorax closer in configuration to that of *Trechodes* and evidently different from that of *Pachytrechodes*; both stria 8 and apical striole on elytra almost vanished; elytral dorsal pores foveolate; and, the posterior one of apical setae absent.

Body small, short and broad, completely glabrous on the dorsum but sparsely pubescent on the ventral surface, with transverse prothorax pedunculate at the base and short oval elytra; surface polished; inner wings absent; colour dark, with light appendages.

Head relatively small, transverse, and not depressed above, with frontal furrows very deeply impressed throughout but not canaliculate; two pair of supraorbital setae present on lines widely divergent posteriad, the anterior one coming out from a large fovea; eyes reduced in size and not protruding, though perfectly faceted; genae long and tumid, completely glabrous; neck constriction sharply marked at the sides. Labrum fairly long though evidently wider than long, with the apical margin widely emarginate. Mandibles stout, obtusely tridentate, with sharply hooked apices. Labium deeply concave at middle, without labial suture between mentum and submentum, the former bearing a large porrect tooth which is either simply rounded or subtruncated at the tip, the latter sexsetose; ligula roundly produced at middle, with two long setae at the tip and three shorter ones on each side; paraglossae

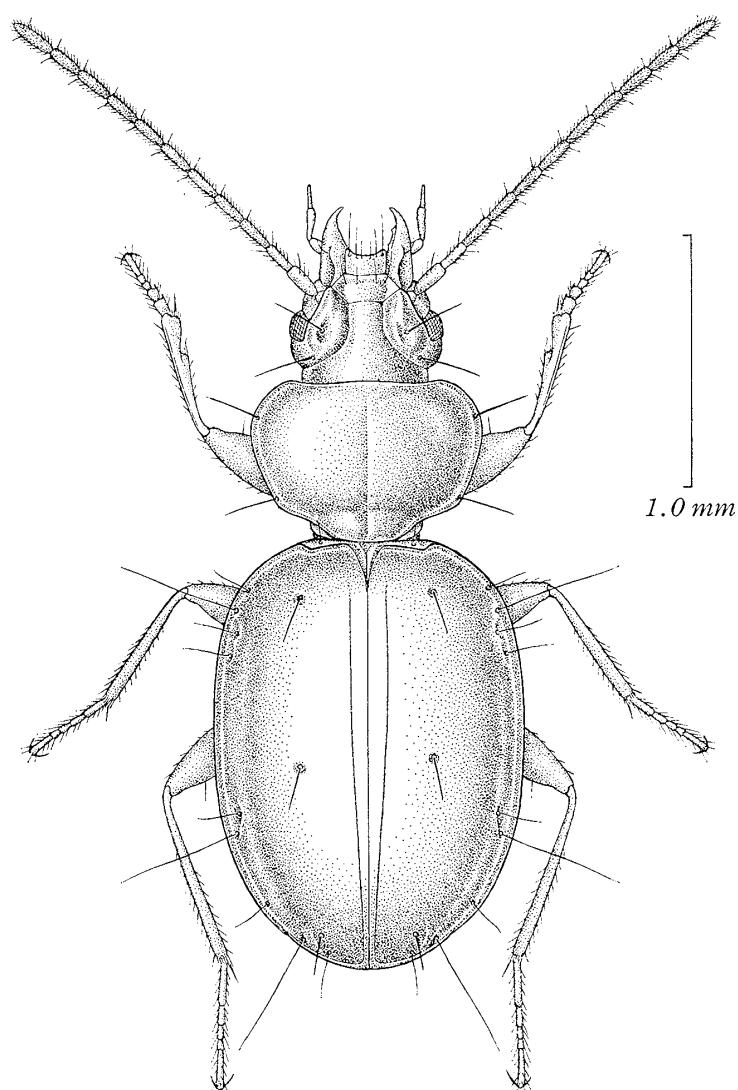


Fig. 1. *Himalotrechodes insignis* S. UÉNO, gen. et sp. nov., ♂, from the Minchhindhap Danda above Sabuwa in East Nepal.

narrow and lightly arcuate, extending beyond ligula. Palpi fairly stout; penultimate segment widest at about apical two-fifths, arcuate and quadrisetose in labial palpus, securiform and asetose in maxillary palpus; apical segment very narrow and subcylindrical, about two-thirds as long as the penultimate in labial palpus, slightly shorter than the penultimate in maxillary palpus. Antennae rather short, though filiform and fairly slender; segment 2 about as long as segment 3 or 4, and slightly shorter than each one of segments 5–10, which are subequal in length to one another; terminal segment the longest.

Pronotum large and transverse, much wider than head, with the basal lobe produced backwards onto basal peduncle; sides strongly arcuate in front, not sinuate behind, and narrowly bordered, the borders continuing onto base and becoming

much finer or almost obsolete at the median part, with two marginal setae, of which the anterior one is situated at a level just before the widest part and the posterior one on hind angle; front angles widely rounded, hind ones very obtuse; median line clearly impressed, deepening posteriad and reaching base; apical transverse impression obsolete, basal one continuous though shallow; basal foveae not clearly defined. Scutellum very small.

Elytra short oval, strongly convex, with effaced shoulders; marginal gutter curved round shoulder, shallowly sinuate at base, and joining scutellar striole without interruption; only stria 1 distinct, deeply impressed and almost entire, subparallel to suture before the level of posterior dorsal pore, and not joining scutellar striole, vague trace of other striae sometimes perceptible as fragments; scutellar striole distinct and oblique, though not long; apical striole extremely short and almost evanescent; two setiferous dorsal pores present on the site of stria 3, the pores being large and foveolate; preapical pore very close to apex and widely distant from suture; anterior apical pore adjoining apical border, posterior one absent; marginal umbilicate pores aggregated, though the four pores of the humeral set are somewhat irregularly ranged.

Ventral surface sparsely pubescent except for the lateral parts; anal sternite provided with a pair of setae in ♂, with two pair of setae in ♀. Legs short though not so stout; protibiae hardly bowed, moderately dilated towards apices, externally grooved, and glabrous on the anterior face; tarsi short, segment 4 with a long hyaline ventral apophysis in pro- and mesotarsi; in ♂, two proximal segments of each protarsus distinctly dilated, inwardly denticulate at apices, and furnished beneath with sexual adhesive appendages.

Male genital organ fairly large. Aedeagus short and flat, widely open on the dorsal side, with very low lateral walls even at the middle part, and surmounting largely exposed inner sac whose apial end nearly reaches the aedeagal apex; apical lobe short, broad and hardly modified; basal lobes complete and symmetrical; inner sac devoid of differentiated copulatory piece though bearing poorly sclerotized minute scales behind middle. Styles short, horizontally broadened; left style much larger than the right and provided with a large broad ventral projection; each style with four short setae at apex.

Range. Known so far only from the Terhathum District in East Nepal.

Notes. Though closely similar to each other, *Himalotrechodes* of the eastern Himalayas and *Pachytrechodes* of Mt. Uluguru in Tanzania are considered independent at generic level, mainly because they must be separately descended from *Trechodes*-like ancestors in widely distant areas. Judging from the conformation of prothorax, the Himalayan species seems to have been derived from an Asian ancestor, while the East African species become descended from an African one. However similar they may look, they must have developed along different lines; their close similarity should be regarded as a convergence resulting from an adaptation for mesophilous life. It cannot be justified to combine two independently evolved

lineages into a single derivative genus, unless they both are regarded as congeneric with the ancestral one. At least to me, it seems appropriate to erect a new genus for the Himalayan trechodine, in spite of the fact that it is rather poorly discriminated from the East African one. I have seen all the described genera and species of Trechodina, and am confident that my view cannot be much biased.

Himalotrechodes insignis S. UÉNO, sp. nov.

(Figs. 1–3)

Length: 2.62–2.74 mm (from apical margin of clypeus to apices of elytra).

Body short and broad, though constricted between prothorax and hind body. Colour very dark brown or almost black, polished, and faintly iridescent; hind body, especially elytra, dark brown, always lighter than fore body; buccal appendages, antennae and legs yellowish brown.

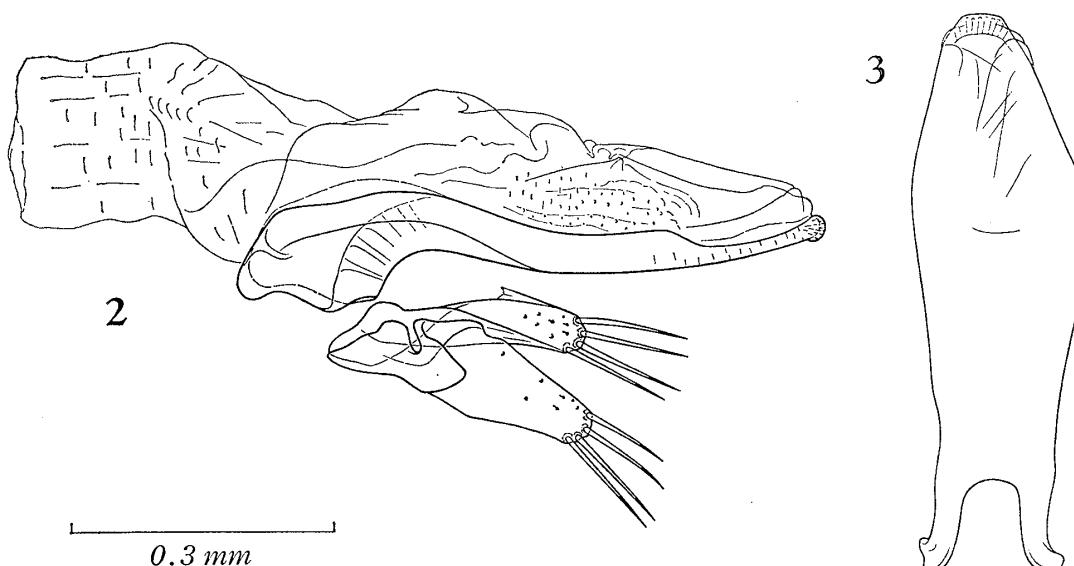
Head much wider than long, not depressed above, with deep frontal furrows widely divergent posteriad and narrowly so anteriad; frons convex; each supraorbital area crateriform; microsculpture distinct, largely consisting of wide polygonal meshes; eyes small, only gently convex or rather flat; genae strongly convex, as long as eyes or only slightly shorter than the latter; neck fairly wide, with the anterior constriction deep and sharply marked at the sides; antennae reaching basal three-eighths of elytra, scape hardly longer than each of segments 5–10 but much wider than the latter, terminal segment the longest, obviously longer, though narrower, than scape.

Pronotum transverse cordate, well convex on the disc, much wider than head, wider than long in a similar proportion, widest at about two-thirds from base, and more strongly contracted towards apex than towards hind angles; PW/HW 1.47, PW/PL 1.44–1.46, PW/PA 1.58–1.59, PW/PB 1.22–1.23³⁾; microsculpture not sharply impressed, though consisting of irregular lines which are mostly transverse; sides moderately reflexed at the widest part, narrowly so in front and behind, strongly arcuate except near hind angles, which are very obtuse and nearly rounded off; apex almost straight, much narrower than the width between the roots of postangular setae, PB/PA 1.30, with front angles widely rounded and hardly advanced; basal lobe remarkably produced backwards, oblique and slightly emarginate on each side, and narrowly truncated at the median part; basal foveae very small and not clearly defined, though shallowly extending antero-laterad; basal area narrow and almost smooth; lateral sides of basal peduncle clearly visible from above on each side of basal lobe.

Elytra short oval, strongly convex, widest at about four-ninths from base, and equally contracted towards bases and towards apices; EW/PW 1.37–1.39, EL/EW 1.30–1.36; microsculpture degenerated, though trace of fine transverse lines is partly visible; shoulders rounded off, with prehumeral borders gently arcuate and not per-

3) The PB value was taken by the width between the roots of postangular setae, since the pronotal base is produced backwards to form the basal lobe and since the hind angles are extremely obtuse.

pendicular to the mid-line; sides moderately reflexed before middle, more narrowly so towards apices, regularly but not strongly arcuate at middle, more strongly so behind, and hardly or only very slightly emarginate before apices, which are conjointly rounded; stria 1 deep, vaguely crenulate, 2–5 either completely vanished or partly visible as a trace, 8 present only between the two pores of the middle set of marginal umbilicate series; stria 3 with two large dorsal pores at about 1/8 from base or a little behind that level and a little behind middle.



Figs. 2–3. *Himalotrechodes insignis* S. UÉNO, gen. et sp. nov., from the Minchhindhap Danda above Sabuwa in East Nepal. — 2. Male genitalia, left lateral view. The styles are so turned as to show the ventro-external (left style) and dorso-internal (right style) faces. — 3. Aedeagus, dorsal view. The overlying inner sac is largely omitted.

Male genital organ fairly large and moderately sclerotized except for aedeagal apical lobe. Aedeagus about two-fifths as long as elytra, broad and flat, gently arcuate dorsad except for basal part, which bends towards the ventral side and forms symmetrical lobes outwardly curved at the tips; viewed dorsally, median lobe widest behind middle and gradually narrowed towards broad apex, which is sub-truncated at the tip; viewed laterally, lateral walls abruptly reduced in height at the apical part, which forms a very flat lobe thickened and narrowly rounded at the extremity. Styles short, each bearing four short apical setae.

Type-series. Holotype: ♂, allotype: ♀, 28–X–1979, Y. NISHIKAWA leg.; deposited in the collection of the National Science Museum (Nat. Hist.), Tokyo.

Type-locality. Minchhindhap Danda above Sabuwa, 2,350–2,450 m alt., in the Terhathum District of Kosi Zone, East Nepal.

Further specimen examined. 1♀, Basantpur, 2,300 m alt., Terhathum District, Kosi Zone, East Nepal, 15–VI–1972, H. MAKIHARA leg. (NSMT).

Notes. This very interesting trechodine is a mesophilous species, so far known only from the oak forests (*Quercus lamellosa*, *Q. semicarpifolia*, etc.) on the high

ridge at the right side of the Tamur Khola River in the easternmost part of the Nepal Himalaya. The holotype was met at an elevation of 2,450 m, crawling on the underside of the trunk of a large dead tree that had fallen down into the under-growth on the steeply slanting forest floor. The allotype was found in a sample of soil-living animals obtained by a sifting funnel. The dead leaves from which the specimen was extracted were gathered near the lower edge of the same forest, at an elevation of 2,350 m.

The Basantpur specimen was taken on the same ridge but in a different forest, about 15 km south by west of the type-locality. It was said to have been found from under a bark of a fallen tree-trunk. The specimen accords well with the allotype, excepting that the head is relatively large and that the pronotum is less contracted anteriorly. The standard ratios of its body parts are as follows: PW/HW 1.42, PW/PL 1.42, PW/PA 1.49, PW/PB 1.23, PB/PA 1.21, EW/PW 1.39, EL/EW 1.28. It was excluded from the type-series because of these slight differences and also of the unfortunate condition of preservation.

ACKNOWLEDGEMENT

I wish to express my deep appreciation to Mr. Yoshiaki NISHIKAWA and other members of the expedition, without whose support the present paper could never be completed. My hearty thanks are also due to Mr. Hiroshi MAKIHARA for the privilege of examining the first known specimen of the present trechodine, and to Dr. P. BASILEWSKY for the loan of *Pachytrechodes* specimens which were indispensable for determining the systematic status of the beetle.

REFERENCES

- BATES, H. W., 1892. Viaggio di Leonardo FEA in Birmania e regioni vicine. XLIV. List of the Carabidae. *Ann. Mus. civ. Stor. nat. Genova*, **32**: 265–428.
- BLACKBURN, T., 1901. Further notes on Australian Coleoptera, with descriptions of new genera and species. XXIX. *Trans. Proc. Rept. R. Soc. S. Austr.*, **25**: 99–131.
- JEANNEL, R., 1923. Les Trechinae [Coleoptera, Carabidae] de la Région Orientale. *Ann. Mag. nat. Hist.*, (IX), **12**: 393–435.
- 1926. Monographie des Trechinae. Morphologie comparée et distribution géographique d'un groupe de Coléoptères. (Première livraison). *Abeille, Paris*, **32**: 221–550.
- 1942. La Genèse des Faunes Terrestres. Éléments de Biogéographie. VIII+514 pp., 8 pls. Presses Universitaires de France, Paris.
- 1954. Trois Tréchites orientaux nouveaux. *Rev. fr. Ent.*, **21**: 10–14.
- 1958. Sur quelques Trechitae de l'Amérique du Sud (Coleoptera). *Ent. Arb. Mus. Frey, Tutzing*, **9**: 721–737.
- 1960. Mission zoologique de l'I.R.S.A.C. en Afrique orientale. (P. BASILEWSKY et N. LELEUP, 1957). V. Coleoptera Carabidae Trechinae. *Ann. Mus. Congo Tervuren*, (in-8°, Zool.), **81**: 39–76.
- MOORE, B. P., 1972. A revision of the Australian Trechinae (Coleoptera: Carabidae). *Austr. J. Zool.*, (Suppl. Ser.), (18): i+1–61.
- MOTSCHULSKY, V. DE, 1862. Remarques sur la collection d'insectes de V. DE MOTSCHULSKY. *Étud. ent., Dresde*, **11**: 15–55.